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Fig. 105
LIFT PUMP FOR GAS SYPHONS. EXCLUDING 24 FT. DEEP

Fig. 256
BELT DRIVEN SINGLE RAM PUMP FOR 40 LBS. PER SQ. INCH.

Fig. 257
BELT DRIVEN SINGLE GUIDED RAM PUMP FOR 60 LBS. PER SQ. INCH.

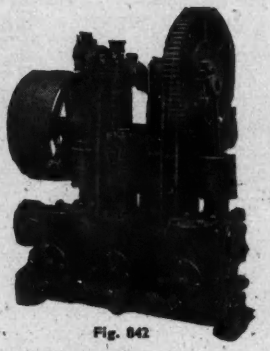

Fig. 842
VERTICAL TREBLE RAM PUMP FOR 150 LBS. PER SQ. INCH.

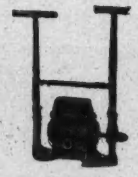

Fig. 187
DOUBLE ACTING HORIZONTAL PUMP.

Fig. 69
COVERED HEAD CHAIN PUMP.

Fig. 324
BELT DRIVEN DOUBLE BARREL PUMP FOR DEEP WELLS.

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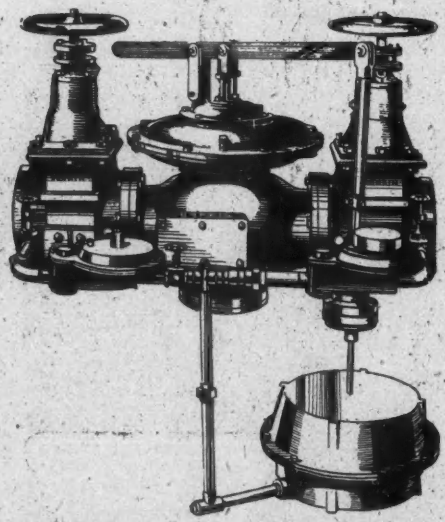

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CONTENTS

EDITORIAL NOTES

A Notable Meeting 737
National Gas Council 737
Tar Shortage Areas 738

Personal 738
Obituary 738

Diary 738
Scottish Juniors 738
National Gas Council 738
Severn Valley Gas Corporation, Ltd. . 738

INSTITUTION OF GAS ENGINEERS

Record of the Proceedings . . . 739
President's Luncheon 740
Institution Membership . . . 743

National Gas Council 744
South-Western Gas and Water Corporation, Ltd. 747
Mobile Gas Producers. By J. R. Denoon 749

Gas Products Prices 751
Gas Stocks and Shares . . . 751

THIS WEEK'S ADVERTISERS

	PAGE
A.C.E. Machinery, Ltd.	733
Alder & Mackay, Ltd.	753
Ascot Gas Water Heaters, Ltd.	Cover I
Aspinalls (Paints), Ltd.	S2
Bale & Church, Ltd.	753
Birmingham Electric Furnaces, Ltd.	S6
Blakeley, Firth, Sons & Co., Ltd.	753
Braddock, J. & J.	745
Bratt Colbran, Ltd.	731
Bristol's Instrument Co., Ltd.	752
British Gas Purifying Materials Co., Ltd.	753
British Ropes, Ltd.	S3
Cowan, W. & B.	Cover III
Curtis, A. L.	S6
Dempster, Robert, & Sons, Ltd.	733
Donkin Co., Ltd. (The Bryan)	Cover II
Evans, Joseph, & Sons (Wolverhampton), Ltd.	Cover II
Gas Meter Co., Ltd.	733
Gas Purification and Chemical Co., Ltd.	753
Glover, George, & Co., Ltd.	727
Glover, Thos., & Co., Ltd.	736
Goodall, Clayton & Co., Ltd.	Cover IV
Green & Boulding, Ltd.	753
Greening, N., & Sons, Ltd.	732
Harrisons (London), Ltd.	753
Holmes, W. C., & Co., Ltd.	S1
Humphreys & Glasgow, Ltd.	734
Hyde, Silas, Ltd.	S7
Jeavons, E. E., & Co., Ltd.	753
Jenkins, W. J., & Co., Ltd.	728
Keith Blackman, Ltd.	S8
King, Geo. W., Ltd.	S2
King's Patent Agency, Ltd.	754
Laidlaw, R., & Son (Edin.), Ltd.	Cover IV
Le Bas Tube Co., Ltd.	S5
London Electric Firm, The	S6
Main, R. & A., Ltd.	746
Mavitta Drafting Machines, Ltd.	S6
Mewburn, Ellis & Co.	754
Mitchell, H., & Co.	S2
Morton, Joseph, Ltd.	S6
Newton Chambers & Co., Ltd.	742
Parkinson, W., & Co.	736
Photostat, Ltd.	S7
Platt, Samuel, Ltd.	S6
Pulsometer Engineering Co., Ltd.	Cover IV
Reavell & Co., Ltd.	S4
Salter, T. E., Ltd.	735
Sawer & Purves, Ltd.	748
Siebe, Gorman & Co., Ltd.	S6
Slingsby, Walter, & Co., Ltd.	S2
Stanton Ironworks, Ltd.	754
Stewarts and Lloyds, Ltd.	730
Strachan & Henshaw, Ltd.	727, 733
Sutcliffe, Speakman & Co., Ltd.	S3
Technical Institute of Great Britain	754
Thomas & Bishop, Ltd.	751
Trotter, Haines & Corbett, Ltd.	754
Turbine Furnace Co., Ltd.	S2
Walker, C. & W., Ltd.	748
West's Gas Improvement Co., Ltd.	750
Wheatoe Foundry & Engineering Co., Ltd.	729
Winn & Coales, Ltd.	732
Woodall-Duckham Co.	741
Trade Cards	751
Appointments Vacant	754
Contracts Open	754
Educational	754
Patents	754
Plant, &c.	753
Plant, &c., For Sale and Wanted	754

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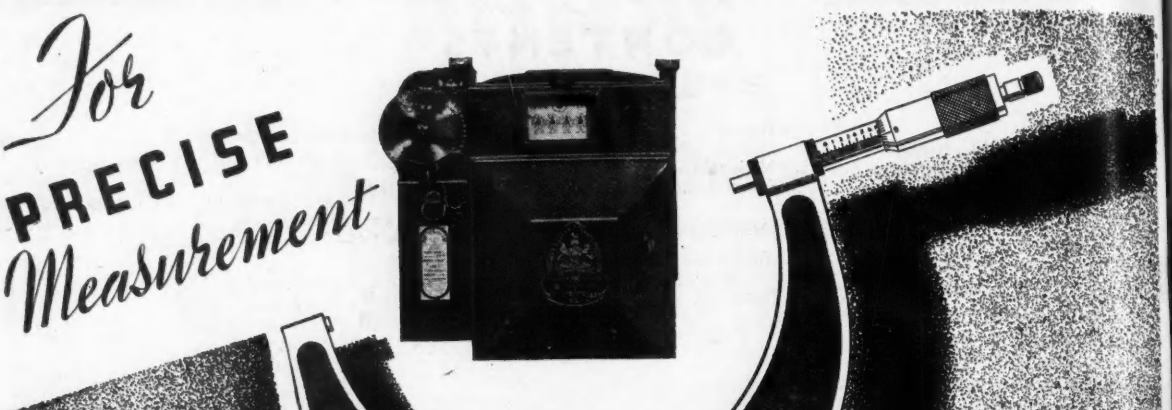

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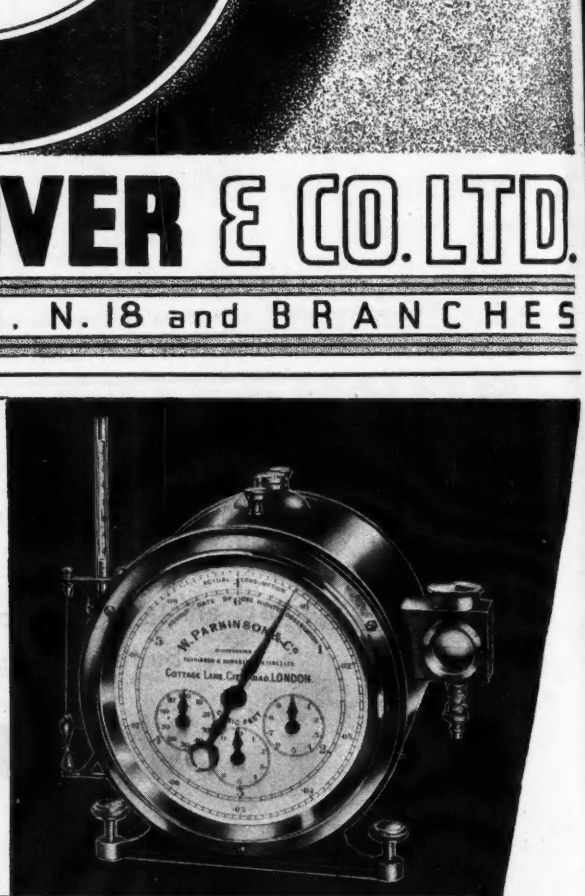

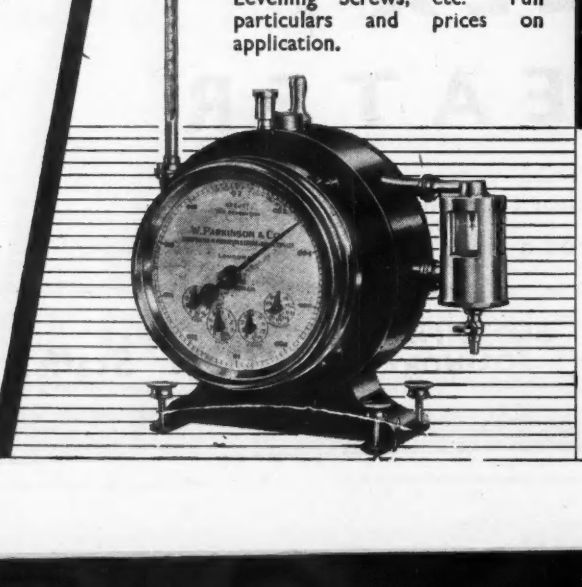

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THE SOCIETY OF BRITISH GAS INDUSTRIES 1905

P.4

GAS JOURNAL, JUNE 16, 1943

VOL. 241 95th YEAR No. 4178

EDITORIAL NOTES

A NOTABLE MEETING

LAST week we suggested that Mr. E. V. Evans would occupy the chair at the 80th Annual Meeting of the I.G.E. with distinction. Our forecast proved correct in the event, and the tributes paid to him so spontaneously were in fact an expression of general opinion. The meeting was exceedingly well attended for a wartime gathering, and it seemed to us that the ovation given to Dr. E. W. Smith on the presentation to him of the Birmingham Medal was happily and surely indicative of the appreciation in which he is held, and of the real desire to practise his dictum that we must seek strength through widespread internal co-operation, understanding of present and future needs, and effective mutual aid. Mr. Evans's Address, in which he analyzed the functions and achievements of the Gas Industry having regard primarily to the public interest, was outstanding. It was an analysis of great clarity, showing that our functions as a constituent part of the national fuel industry are at present of major importance, and can well become of far greater importance.

It is, as Mr. Evans said, essential for the good of the nation that considerations of political or commercial opportunism should not rule the future development of so important a part of the national economy as fuel usage. The problems involved are fundamentally technical and economic, and satisfactory solutions will be found only if full weight is given to these basic technical and economic aspects. On such grounds it is possible emphatically to state that development of gas supply on a scale much beyond our present record would confer large benefits upon the community. It follows that we must be able to define clearly what we conceive to be the contribution we can make. In a speech on a rather subdued note at the President's Luncheon, the Minister of Fuel, Major Lloyd George, was, however, emphatic on two points. First his conviction of the need for continuance of the Ministry after the war; secondly his desire for co-operation between the various fuel industries. "Competition," he remarked, " is valuable; a great deal of the efficiency of the industries of the country has been brought about by it. But competition can go too far; so-called free and unfettered competition has not always been for the benefit of the consumer." And he referred to the vital nature of the Gas Industry's services both in war and in peace.

A very large amount of work and endeavour is packed into this one-day Institution meeting, and the clock-fighting element was present throughout. The six Papers presented were short, and even so were only introduced in abstract by the Authors. Yet it seemed that we had not nearly enough time for discussion. Is the programme too ambitious? Have we arrived at a stage when sectional meetings would better cope with the purpose in view? We realize that the latter question is more related to peace-time conditions, but we ought to try to get away from discussions for discussion's sake. We will not labour this point, but to exemplify it in one particular, how many more times is it going to be thought necessary to point out in Institution contributions that it would be a good thing to eliminate sulphur from town gas (*vide* Mr. Evans's Address and the comments of Mr. George Dixon). Instead of acting, we seem to be settling down to discussion again, often on the all too obvious. We feel that, with the will to act, more good could result from Institution discussions; and we say this appreciating the potential usefulness of the discussions on the contributions at the meeting last Wednesday, a record of the proceedings at which appears on later pages. We shall deal subsequently with the individual contributions and with the discussions to which they gave rise.

§§

NATIONAL GAS COUNCIL

CONVENIENTLY arranged to coincide with the visit to London of many members for the Institution meeting, what may well have been the last Annual General Meeting of the National Gas Council drew a record crowd last week. The proceedings, which covered formal business for all the war years, were otherwise largely concerned with bidding farewell to Sir David Milne-Watson as President of the Council. The obvious sincerity not only of the tributes paid to his work and to himself personally, but also of their acclamation by the assembled company, must have made the best of a sad occasion for Sir David. Certainly it was clearly demonstrated that "even the ranks of Tuscany" bear no ill-will, as indeed no true Briton bears ill-will towards a " bonnie fechter." But the continued existence of Tuscan ranks was acknowledged by Sir David in his reminder that true democracy implies the acceptance by the minority of whatever appears best to the majority, and his implication that it is no very long step from opposition to obstruction.

No one will quarrel with the very wise decision to leave the Chairmanship temporarily in abeyance, and the generous offer of Mr. Frank Jones to take the chair in the meantime in his capacity of Vice-President is truly deserving of general gratitude. It will, in fact, leave the new constitution, whenever it may be formed, free to break entirely away from precedent if it so desires, with no embarrassments in respect of a President with an "unexpired" term of office. And, like many others, we believe that the new constitution will start life in a much happier atmosphere if it does break away from precedents. This, again, is no expression of opinion that all was bad which has gone before; far from it. But *autres temps, autres moeurs*—and when we do make our fresh start in life by all possible means let it be fresh, and not just a mild rehash of the old order.

We would make reference to one other point which was raised at the meeting. It is no part of our stock-in-trade to claim to have foreseen every Gas Industry problem many years before it arose, but not so long ago we did express anxiety at the apparent lack of interest shown by the "owners" of gas supply in the fate of their "property." In the very early days the columns of the "JOURNAL" recorded battles royal between rival companies and, we believe, directors competing for the privilege of supplying gas to undeveloped areas frequently did violence to one another's silk hats. We do not advocate any revival of partisanship on these lines (even though headgear remains coupon-free), but we do heartily endorse Mr. Dixon's hope that more people on the ownership side will take part in our future discussions, and Mr. Frank Jones' stricture on directors that many in the past have been too easy-going. It is particularly significant that Mr. Dixon, with experience of a municipality which has long shown a live interest in the wider problems of gas, should have taken this view, and what Mr. Frank Jones does not know of gas company directors can scarcely be worth knowing. Indeed, if members of gas committees confine their interest purely to matters of local import, they are not fulfilling the whole of their duty to the ratepayer owners in these days when gas matters are increasingly being regarded on the national scale. While, too, there is much to be said in favour of local interests being represented on company boards of directors, it is, in our view, equally necessary in these times for the professional man, tradesman, or whoever accepts a seat on the board, to regard himself as trustee for a public utility extending far beyond his own High Street.

Tar Shortage Areas

The Tar Controller has issued a direction to tar distillers in the Eastern and London Divisions of the Ministry of War Transport, and in Berkshire (which is in the Southern Division), that these are "shortage" areas. Tar distillers in these areas (unless their stocks exceed amounts specified to them by the Tar Controller) will supply tar, and tarmacadam manufacturers will supply tarmacadam, only for Air Ministry requirements, or on the authority of a permit issued by the Ministry of War Transport's Divisional Road Engineers. Anyone in the shortage areas needing tar or tarmacadam for other than Air Ministry requirements should apply to the appropriate Divisional Road Engineer for a permit.

The Eastern Division comprises Notts, Lincs, Rutland, Northants, Bucks, Beds, Hunts, Isle of Ely, Cambs, Norfolk, and Suffolk; and the London Division covers London, Herts, Essex, Middlesex, Surrey, Kent, and Sussex.

Personal

Mrs. J. WESLEY WHIMSTER, head of Bath's W.V.S. organization, has been awarded the M.B.E. Her husband is a Director and the Engineer of the Bath Gas Company.

* * *

Mr. G. HULMES, of the City of Salford Gas Department, has been appointed Shift Engineer to the Oldbury Gas Department.

Obituary

Mr. J. L. BUTLER, Managing Director of W. J. Jenkins & Co., Ltd., Gas and Constructional Engineers, Retford, died on June 12 at the age of 53.

* * *

The death has occurred of Mr. M. DARLING, District Supervisor, Broxburn Gas Company, Ltd., at the age of 59. He was an Hon. Member and Hon. Auditor of the Scottish Junior Gas Association (Eastern District) at the time of his death, and held the post of Hon. Secretary and Treasurer in the Session 1917–18, and of Hon. President in the Session 1926–27.

Diary

June 21.—London and Counties Coke Association, Gas Industry House.—Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m.
June 23.—Industrial Gas Centres Committee, Gas Industry House.
June 24.—Midland Association—Meeting in Birmingham, 2.30 p.m. Address by Dr. J. G. King, Director of the Gas Research Board.
June 25.—Waverley Association, Edinburgh, 10.30 a.m. Presidential Address of Mr. W. M. Henderson.

Scottish Juniors

The Annual Meeting of the Scottish Junior Gas Association (Eastern District) was held in Dunfermline on May 31. Mr. S. G. Melville presided.

After a full discussion it was unanimously agreed that the Association should affiliate with the British Junior Gas Association Joint Council.

Mr. T. B. Livingstone explained the need for a Transactions Secretary, and recommended that Mr. J. T. Murray, Perth, should be appointed; this was agreed.

The following Office-bearers were elected for Session 1943–44:

President.—T. B. Livingstone, Perth.
Vice-President.—Wm. Masterton, Edinburgh.
Hon. Secretary and Treasurer.—W. H. Carson, Edinburgh.
Transactions Secretary.—J. T. Murray, Perth.
Librarian and Education Representative.—A. J. Doran, Edinburgh.
Council.—S. G. Melville, Edinburgh (*ex-officio*); T. R. Sawers, Perth; A. Ramsay, Galashiels; J. R. Denoon, Edinburgh; A. McNeil, Hamilton; R. Air, Cowdenbeath.
Hon. Auditors.—M. Darling, Broxburn, and E. L. Farquhar, South Elmsall.

The Factory and Offices of Ascot Gas Water Heaters, Ltd., will be closed for the annual holiday from June 26 to July 5. In consequence it will not be possible to accept delivery of "Ascot" appliances for repair during that week.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

National Gas Council

A Meeting of the Central Executive Board of the National Gas Council was held on June 8 at Gas Industry House. Sir David Milne Watson, Bart., LL.D., D.L., presided.

Before proceedings started, Sir David was unanimously nominated for election as Honorary Member of the Council at the annual meeting following the meeting of the Central Executive Board.

Sir David expressed his pleasure at the honour, and his regret at having to relinquish his activities on medical advice. He emphasized that he would continue to take a deep interest in the Council and its work, and hoped to be able to attend some of their meetings in the future and follow the fortunes of the Gas Industry, and keep up the many friendships which he had formed in the long period during which he had presided as Chairman of the Board and President of the Council.

The Chairman, on behalf of the Board, warmly congratulated Mr. A. W. Smith, C.B.E., General Manager and Secretary of the City of Birmingham Gas Department, on the recent honour conferred upon him by H.M. the King.

Mr. C. H. Chester (Swindon United Gas Company) was also congratulated on having received the O.B.E.

The Chairman said he had to report with regret the death of Mr. J. McNicholl (Cork Gas Consumers' Company), who had been a member of the Board since 1921. A letter of condolence had been sent to the Cork Gas Company on behalf of the Board.

It was reported that, at a special meeting of the Finance Committee held on May 31, the annual accounts of the Council for the financial year 1942/43, as audited, had been examined, and copies had been forwarded to the members of the Board.

Mr. E. V. Evans, Chairman of the Ministry of Fuel and Power Gas Advisory Committee, reported upon the first meeting of the Committee with the Minister on May 21, and obtained the authority of the Board for that Committee to speak for and to proffer advice on behalf of the Industry at these meetings. The Committee would report to the Board regularly.

The next meeting will be held on July 13, at 2.30 p.m.

Severn Valley Gas Corporation, Ltd.

The Ninth Ordinary General Meeting of the Severn Valley Gas Corporation, Ltd., was held at 15, Moorgate, E.C., on June 10.

Major Julian Day, M.C., the Chairman, presided.

The following is the Chairman's statement circulated with the report and accounts: The Directors' report and the accounts indicate that financial stability has again been maintained. Revenue is increased by £1,508. After providing for payment of the dividends recommended—namely, a final dividend of 2¾%, less tax, on the ordinary stock (making 5½% for the year), and a dividend of 6%, less tax, for the year on the deferred stock—the balance to be carried forward, as shown in the Directors' report, will be £19,314, compared with £16,007 brought in. These dividends are at the same rates as paid for the last five years. These results cannot fail to be gratifying to our large body of stockholders.

The real story of our progress can only be disclosed through the operations of our constituent companies, and to these, to my great regret, I am prevented from referring by direction of the Board of Trade. In present conditions each separate undertaking is faced with problems pertaining to its own locality to maintain at all times an adequate supply of gas, however extreme the fluctuations in demand, both for domestic and industrial purposes. Even in normal times such difficulties would have appeared most formidable, especially so in the case of the relatively smaller undertakings.

Present conditions, entailing irregularities and delays in supplies of coal and of materials required for repairs and maintenance as well as for extensions, and above all the loss of skilled employees thoroughly trained in the Industry, have made these problems at times almost insurmountable. That they have been overcome and efficient service throughout the group so well maintained has been due to the devoted service and unfailing energy of managers, staff, and employees of these constituent companies. So many have shown self-sacrificing devotion to duty, little recognized, and yet so essential a part of the war effort. Such services will be remembered. To all of them and to the body of employees who have continued loyally in our service I send our grateful appreciation.

I should report that wherever we have been able to lay connecting mains between centres of production efficient service and economic supplies have been greatly facilitated.

Our central organization also has suffered from the strain of unusual effort with inadequate numbers. To relieve somewhat our very overworked Managing Director, to whom again our special thanks are due, Mr. R. S. Snelling, of the Newport Gas Company, has been appointed General Manager of the Corporation. He enjoys the complete confidence of the Directors, and some of the benefits to be expected from this appointment are beginning to appear.

During the year Lieut.-Col. C. P. Dawnay, who until called to the Forces acted as Joint Secretary to the Corporation from its inception, has resigned from that position, but we look forward to the time when

(*Continued on p. 747*)

INSTITUTION OF GAS ENGINEERS

80th General Meeting of the Institution

RECORD OF THE PROCEEDINGS

THE 80th Annual General Meeting of The Institution of Gas Engineers was held in London—at the Institution of Civil Engineers—on June 9, when there was an attendance in the neighbourhood of 600. The President, Mr. E. V. Evans, O.B.E., F.I.C., was in the Chair, and at the outset he asked the Secretary (Dr. W. T. K. Braunholtz) to read a message from the American Gas Association received from Major Alexander Forward, the Managing Director, which read:

American gas fraternity marches with you in determined unfaltering advance to victory and reconstruction.

Naturally this gracious message was met with appropriate enthusiasm, which put the meeting in the best of good humour.

So the President then moved that the 80th Annual Report of the Council for 1942–43, and the Accounts, be adopted. Sitting at the Press table we awaited the customary performance, remembering how Mr. George Helps, of Nuneaton, registered a year ago that the 1941–42 report contained no reference to gas quality. Sure enough, up popped Mr. Helps, rising on a point of order, maintaining that if nobody wanted to hear what he had to say it was just too bad and that he was being treated unfairly. After all, he remarked, he had done something for the Gas Industry—and that was more than some of those gathered auspiciously together at the meeting could truthfully say. Efficaciously, the President poured oil on troubled waters, and the meeting backed him up by loud cries of "Chair" and "Sit down Mr. Helps." "Sit down be hanged," retorted Mr. Helps, who, however, had to resume the sitting position. The meeting shouted him down. After which little interlude—not a particularly enlightening interlude—we came to the business of the meeting and the announcement of the ballot for Officers, Auditors, and Ordinary Members of Council, thus:

President, 1943–44, James Jamieson, of Edinburgh, who thanked the members for the tribute, paid through him, to Scotland. *Vice-President*, 1943–44, S. E. Whitehead, of Southampton; *Vice-President*, 1943–45, C. M. Croft, of Wandsworth—both of whom expressed their thanks. *Auditors*, H. C. Smith and A. Morland; *Hon. Secretary*, John Terrace; and *Ordinary Members of Council*, E. Crowther (Newcastle), H. J. Escreet (London), T. F. E. Rhead (Birmingham), R. C. Taylor (Torquay).

The President then referred to the appointment of two Honorary Members of the Institution, Mr. A. T. Green, Director of Research, British Refractories Research Association, and Professor D. T. A. Townend, Livesey Professor at Leeds University. These elections met with everybody's satisfaction.

The Secretary then announced the names of District Members of Council for the year 1943–44: Irish, H. L. Adams (Tipperary); Wales and Monmouthshire, J. F. Rust (Newport); Manchester, W. Fletcher (Liverpool); Southern, W. A. Howie (Maidstone); North of England, J. W. Pallister (Middlesbrough); Midland, C. F. W. Rendle (Redditch); Eastern Counties, F. H. Robinson (Bishops Stortford); North British, R. Fife (Kilmarnock).

Presentation of Medals

We came to the presentation of medals. The highest award the Institution can make is the Birmingham Medal, which is awarded infrequently and only in recognition of most distinguished services. Instituted over 60 years ago, it has been presented fifteen times, the fifteenth being at the meeting when Dr. E. W. Smith, C.B.E., joined a short list of illustrious names, which includes John West, father of the Institution's immediate Past President, Sir Frederick West. And most graciously Sir Frederick had returned his father's gold medal so that it could be re-inscribed for Dr. Smith. It was singularly appropriate that the Birmingham Medal should be given to one who has carried out distinguished work at Birmingham. Presenting the Medal, Mr. Evans referred to the services rendered by Dr. Smith as Director-General of Gas Supply. The Medal was presented amid hearty and prolonged acclamation.

The Institution Silver Medal was awarded to Mr. J. Corrigan, and the Bronze Medal (a dummy *pro tem.*) to Mr. H. N. Dann.

At this stage the President introduced his Address—see last week's "JOURNAL." A vote of thanks was proposed by Mr. E. Crowther, who described the Address as one remarkable both in scope and breadth of outlook, the product and essence of mature thinking. And he took the opportunity of mentioning the appointment of Mr. Evans as Chairman of the Ministry of Fuel Advisory Committee, suggesting that no one was better qualified for the post, to which he had been called by democratic vote which testified to the confidence which the Gas Industry reposed in his ability and discretion. Dr. H. Hollings, who seconded the vote of thanks, said that in the Address they had a picture not only of the complexity of their work, but also of the breadth and depth of interest in the financial and engineering problems with which they were confronted.

Benevolent Fund

The meeting was then adjourned for the meeting of the Institution Benevolent Fund. Moving the adoption of the Report and Accounts, Mr. Evans urged members of the Institution to sign a deed of covenant to cover their subscriptions. He explained that only 25% of the subscribers subscribed under this principle. He also expressed their thanks to Sir Frederick West for a generous contribution under deed of covenant which he had made to mark his presidential year. Mr. C. T. Price seconded the motion, which was carried.

The Gas Industry: Considerations on Further Development

This brought us to the technical business of the meeting, presentation and discussion of the short Papers comprising Communication No. 259, "The Gas Industry: Considerations on Further Development." The Communication comprised six Papers: "Standards of Technical Performance," by G. Dixon; "Regional Gas Engineering Advisory Boards," by C.F.W. Rendle; "The Problem of Calorific Value," by J. E. Davis; "The Design of Distribution Systems to Supply Post-War Development," by H. J. Escreet; "The Design and Supply of Domestic Gas Appliances," by J. E. White; and "The Design and Performance of Gas-Works Plant," by A. G. Grant. We shall start publication of these Papers next week, together with the discussions to which they gave rise. On Mr. Dixon's Paper the contributors were Mr. E. Crowther, Mr. J. T. Haynes, Dr. J. G. King, Mr. G. E. Currier, and Mr. George Helps. On Mr. Rendle's Paper, Mr. G. C. Pearson and Mr. T. F. E. Rhead, following whose remarks the meeting was adjourned, and in the interval there was the President's Luncheon at the Savoy Hotel. Our report of the speeches is given later.

The business session was resumed in the afternoon, when discussion was continued by Mr. F. C. Briggs and Mr. E. M. Edwards on Mr. Rendle's Paper. There followed the Paper by Mr. Davis, discussed by Mr. T. C. Finlayson and Dr. S. Pexton; Mr. Escreet's Paper by Mr. C. A. Masterman, Mr. Tate, Mr.

J. H. Dyde, Colonel J. A. Gould, and Mr. F. H. Robinson; Mr. White's Paper by Dr. Harold Hartley and Mr. Masterman; and Mr. Grant's Paper by Mr. Charles Cooper, Mr. R. J. Restall, and Dr. J. G. King.

Time having precluded further discussion, there came a vote of thanks to the Institution of Civil Engineers, the Authors of Papers, the Scrutineers of the Ballots, the Officers, Auditors, Council, and Committees of the Institution, and the Secretary and staff. This was proposed by Mr. A. H. Andrews and seconded by Mr. H. Platt.

Presentation of Presidential Certificate

The meeting was concluded by the presentation to Mr. Evans of the Presidential Certificate. This was performed by the new President, Mr. James Jamieson, who said Mr. Evans had been one of the Institution's most outstanding Presidents, if not its brightest gem. They respected his ability, they appreciated his courage, his confidence, his enthusiasm, they liked his well-disciplined and well-ordered judgment, but they admired him especially for the diligent and devoted attention he had given to the District Associations during these very difficult travelling times. Though he was retiring from the Presidency, it was a matter of great satisfaction to know that his great experience and ability would still be available to the Institution and to the Industry. Mr. Evans, in reponse, said he had hoped for some freedom after his year of office, but it so happened that the Minister of Fuel and Power had appointed an Advisory Committee. They had had one or two meetings, and he could see there was much work to be done in that direction. He had thoroughly enjoyed himself as President of the Institution, and only wished he could live up to the pleasant things that had been said about him.

PRESIDENT'S LUNCHEON

THE President's Luncheon was at the Savoy Hotel. There was a large attendance, and the guest of honour was Major G. Lloyd George (Minister of Fuel and Power). The President (Mr. E. V. Evans) was in the Chair.

The PRESIDENT, proposing the toast of "The Guests," and coupling with it the name of Major Lloyd George, said the privilege of proposing the toast of "The Guests" was perhaps one of the most pleasant tasks of the year of office. Each President performed it with great pride, and, if he might add, some trepidation. Pride because the Institution was honoured by the presence of eminent men in many spheres of life, and trepidation because of their eminence. Personally he believed that when a person became eminent he had developed a delicate sense of discrimination. It was an essential part of his eminence that he should know what was right and what was wrong, what was well said and what was badly said. He set himself standards and expected those standards in others. They were proud to have as their chief guest Major the Rt. Hon. Gwilym Lloyd George, Minister of Fuel and Power, and with him were prominent members of his staff. At the same time he expressed to Sir John Thornycroft (President of the Institution of Civil Engineers) thanks for his presence. He welcomed also representatives from the Dominions and the Allied Countries; from most of the Departments of His Majesty's Government, including the Department of Scientific and Industrial Research; from the Universities, Learned Societies, kindred Institutions, Trade and Research Associations; the Government Laboratory and the Parliamentary and Scientific Committee. The presence of so many distinguished guests was indicative of the close connexion that existed between the Gas Industry and other realms of endeavour.

From time to time in conversation with the Minister one or other of them had expressed their gratification that the interests of all spheres of fuel had been brought under the aegis of one Ministry. However desirable this might have been in the past, it was certain that a form of unified control was necessary to-day and would be equally so in the future. The Gas Industry believed that the gas-making process and the service rendered by the Industry would now be judged from the large national standpoint, and he assured the Minister that the Industry was content so to be judged.

The Ministry of Fuel and Power had asked the Gas Industry to formulate its policy for the future. This was a matter of great satisfaction to the Industry, for they preferred to formulate the plans themselves, and with the help of the Ministry to re-cast the Industry so that it might take its proper place in the new Britain of the future. But, as the Minister knew only too well, there was a war to be won and the Industry was vital to its successful conduct. It was indeed a difficult matter to enumerate any materials used in war in which gas did not play a part. A topical example, of course, was the bombing aeroplane. The majority of the parts in its construction required gas as the heating medium in their manufacture. Some of the tar produced in making the gas returned to the bomber as plastic mouldings for its many instruments of control and navigation. The explosive in the bombs that it carried was derived largely from the products of gas manufacture, and even the uniforms of the crew required a coal-tar derivative known as Air Force Blue.

It was the present main endeavour of every member of the Gas Industry to serve the country as best he could, and in this matter he would like to make reference to the Gas Engineering Advisory Boards which were now in operation throughout the country. This was a system of what might be termed "regional mutual help," and aimed at the maintenance of adequate gas supplies for our war effort and the achievement of maximum efficiency in the use of coal and oil. The beneficial effect of this organization was already being felt, and he wished to take the opportunity of thanking the Minister for the letter he sent him giving encouragement to those engineers and chemists who were giving their services to this organization.

The Minister had expressed the opinion that the gas and electricity industries should be complementary to one another. This was indeed sound advice, and in his own Presidential Address he had tried to show how much, by co-operation, these industries could not only help in the development of each other's industry, but how much both industries could benefit both themselves and their consumers, and how easily they could impede each other unless they agreed to some degree of co-ordination and understanding. So important did he regard this matter that he had ventured into the realms of prediction—some might call it phantasy—and had described in some detail in that Address the benefits that would be conferred upon an imaginary township supplied with a properly co-ordinated fuel service.

There was one matter arising from this analysis that he did not think could be refuted. It was that the two fuel industries—gas and electricity—should, for the benefit of the nation and of the public, co-operate. He believed that co-operation would result not only in an appreciable extension of both industries but, what was of greater importance, in a large reduction in the cost of both commodities to the public. He suggested that an examination of the highly complex technical and economic problems associated with the formulation of a national fuel policy should be the responsibility of the Minister of Fuel. The Industry believed that the Minister, with the help and advice from the fuel industries, would, in due time, shape a comprehensive and statesmanlike fuel policy. Questions such as the avoidance of uneconomic competition, the establishment of a wise degree of co-ordination among the various fuel industries, the provision of adequate alternative facilities so as to allow freedom of choice by the consumer, the problems of coal conservation, smoke abatement, atmospheric pollution, &c., were all matters requiring the most careful consideration. Therefore it was hoped that when the time was opportune, the Ministry would frame a comprehensive fuel policy.

The MINISTER OF FUEL AND POWER, responding to the toast, said the present occasion was interesting because this was practically the first anniversary of the day the Ministry was formed. It was formed to co-ordinate the use of the fuel resources of the country in order to make the best use of them for the war effort. That was the main purpose, and he thought it could be said at the end of the first twelve months that considerable things had been achieved. He would be very foolish not to recognize that the strain on our fuel resources would grow and not diminish as the war continued towards its conclusion. This was not an occasion for him to speak at length about coal, but as it was the basis of our fuel and power resources, it was obvious that every new commitment that we made on the Continent of Europe, or wherever else it might be, meant new demands for coal from this country. Moreover, there was a diminishing man-power, which was bound to have its effect.

As the President had reminded them, the war was the immediate task to be faced. It had always impressed him to see the tremendous power of this country to solve its problems in war. For that reason he had also been a little mystified at the reluctance of the country to use that same energy and unity for solving equally great problems in peace. One of the great efforts must be in wise planning and scientific use of our fuel resources, because, after all, our fuel resources must remain the basis of our industrial strength. He fully appreciated that peace problems were, if anything, more difficult than war problems, and it was difficult to convey to every citizen in the country that a special effort from him was just as necessary in peace as it was in war.

The Ministry of Fuel and Power had been received with acclamation, and he found it difficult to believe that it would pass away with the war. It was the task of the Ministry to co-ordinate the use of fuel—viz., gas, electricity, coal, and oil—and it was not an easy matter. He wanted to see that the knowledge of fuel technique was spread among all the people. If there was one thing this war had done more than any other, it was to make the people of this country, whether domestic or industrial, fuel conscious. During the reconstruction

period there were bound to be tremendous possibilities for these industries.

There had been much talk about co-operation. He supposed he started it in a public speech; but what did he mean by co-operation? He did not mean that it should be dictated from the Ministry as to how this should be brought about. That was not his idea of co-operation. There must be co-operation not only between industries but co-operation within the individual industries, and certainly co-operation between the Ministry and the industries which were responsible for fuel. Admittedly competition was valuable, and he appreciated that a great deal of the efficiency of various industries in this country, particularly the fuel industries, had been brought about by keen competition. But even competition could go too far. They knew that the free and unfettered competition between public utility undertakings had not always been to the ultimate benefit of the consumer. Therefore, the public utility undertakings must cultivate within themselves a sense of national responsibility. He wanted to see in the fuel industries a sense of comradeship in the pursuit of a common aim which, he repeated, was the efficient use of our coal resources. Let it not be thought that that was an idle phrase. He believed that a tremendous amount depended, as far as the future of this country was concerned, on the intelligent use we made of our fuel resources.

As regards co-operation between gas and electricity, there were some who regarded the electricity industry as a young industry simply waiting for peace to rush forward again. On the other hand, there were some who regarded the Gas Industry as having reached middle age. Surely that was not the case. The Industry had passed through a complicated history from the time when it distributed light alone to the time now, when it supplied not only light but heat and power, benzole, tar, sulphuric acid, and other commodities. Surely it would be better to regard the Industry as being a young industry entering a new sphere of activity. Some of the possibilities were clear. The interests of the Industry would be closely bound up with the plastics and chemical industries after the war, and it was vital that the least efficient units in the Industry should come up to the standard of the others. In the electricity industry there was the grid system, while the Gas Industry consisted to a large degree of small local concerns. Therefore there was great need for intensified effort to see that the weakly were as strong as the others.

Continuing, Major Lloyd George said he wished to take the opportunity of expressing his gratitude to the Gas Industry for the assistance he had had from it. The Gas Advisory Committee had just been set up; it had been selected by the Industry, and he believed the names of those who were on that Committee had the general confidence of the Industry. Through that Committee the Ministry would be kept in the closest possible touch with the Industry. At the same time, he wished to take the opportunity publicly of paying his tribute to the services rendered by the Gas Industry to the war effort. Without mentioning any names, he knew that from the advisers at the top to those who repaired during the blitz, this country owed a great deal to these men. The war brought many serious difficulties but the Industry had kept on manfully. He believed that the Advisory Board would enable the Industry to get closer together. In the fuel economy campaign the Industry had played its part manfully, and he had a few figures of the manner in which economy had been practised in gas. These figures, it was true, referred to consumption of coal in the Gas Industry. In April, 1942, there was an increase of 11% in the amount of coal used as compared with the previous year. By December of that year the percentage increase had fallen to 5.3%. By January of 1943 it had fallen to 1.5% below the previous year; in February, 1943, to 5.3% below the previous year, and in March, 1943, to 5% below what it was in the previous year. These were remarkable figures.

In conclusion, the Minister said that planning for the future was not only essential for the national good, but it was also essential to ensure that the Gas Industry occupied the place in the national economy that its importance unquestionably justified.

Sir JOHN THORNYCROFT, K.B.E. (President, Institution of Civil Engineers), proposing the toast of "The Institution of Gas Engineers," spoke of the close links between the Institutions of Civil and Gas Engineers, and recalled that there were many members of the one Institution who were also members of the other. With regard to the treatment of coal, he said that the Gas Industry dealt with only 20% of the total output, so that there was plenty of scope for further development in the Industry in making more effective use of our coal resources. Speaking of co-operation in the Industry, he suggested there was also need for co-operation among the various engineering institutions and societies to ensure that their work was intelligently allied. To some extent at the present time there was rivalry among the Institutions and Societies, but they should all pull together. The objects should be to secure a unification of membership and more standardized educational facilities, and he had no doubt that a great deal more would be done in that direction. In the same way there should be more co-operation between the various branches of engineering to enable engineers to play their part not only during the war, but in the period of reconstruction.

Mr. JAMES JAMIESON (President-Elect), who responded to the toast, said he regarded it as a great compliment to the Gas Industry that this toast should have been proposed by Sir John Thornycroft, who had reached such eminence in his own branch of engineering. It was a circumstance which must give particular satisfaction to many members of The Institution of Gas Engineers who were also members of the Institution of Civil Engineers. It was indicative, also, of the bonds which united engineers in all branches of the profession, the bonds of common interest in all things scientific, and of service to the community at large. For that reason it had often occurred to him that the bonds which united engineers might with advantage be strengthened by a closer liaison and more intimate contact between the various engineering groups, because there was hardly any aspect of engineering which did not affect all the others in greater or less degree.

The Gas Industry was now processing about 20 million tons of coal per annum and providing some 1,600 million therms of gas and 9 million tons of coke. These two fuels, through their greater efficiency in use, were replacing at least 50 million tons of coal—a net saving in coal annually of 30 million tons. Translated into terms of man-power, this meant that at least 100,000 underground workers had been released from uncongenial toil in the bowels of the earth. Was this not a great humanitarian achievement? The latest step of the Gas Industry had been to strengthen its research organization by the creation of a Research Board which was affiliated with the Department of Scientific and Industrial Research, and was financed partly by the State. That the Board was now a State-aided research association was a matter of great satisfaction to the Industry, because it indicated a growing realization by the State of the importance of the coal-processing industries in their schemes of post-war planning. The Gas Industry, too, had its post-war plans. It was a great satisfaction to him to feel that out of the uncertainties of the inter-war years and the welter and chaos of the war there were emerging not only new scientific discoveries but a new spirit, a new morale, a new conception of the value and worth of the Gas Industry, a new sense of responsibility in the individual, a determined and sustained urge towards greater service to the people and to the State.

Mr. F. H. JONES (President, South Metropolitan Gas Company) proposed the final toast of "Our Chairman and Retiring President," and Mr. EVANS briefly acknowledged it.

INSTITUTION MEMBERSHIP

At the Meeting of The Institution of Gas Engineers on June 9 the following were elected to membership:

Honorary membership.—The Presidents (*ex-officio*) of the Gas Associations of Australia, Canada, New Zealand, and United States of America; Green, A. T., F.I.C., F.Inst.P., Director of Research, British Refractories Research Association; Townend, D. T. A., D.Sc., Ph.D., D.I.C., Livesey Professor, University of Leeds.

Membership: Atkin, F. L., Birmingham Gas Department; Bardgett, H., M.Sc., Fuel Research Station; Davis, J. E., A.I.C., South Metropolitan Gas Company; Drake, J. A., Drakes, Ltd.; Farror, R. M., Wandsworth and District Gas Company; Hutchison, W. K., B.A., B.Sc., Air Ministry; MacDougall, D., A.R.T.C., F.I.C., Fuel Research Station; Martlew, W. S., Leigh Gas and Water Departments; Morton, B. C., Robert Dempster & Sons, Ltd.; Stanier, J. E., G.M., M.I. Chem.E., Stoke-on-Trent Gas Department; Webster, J., Lockerbie Gas Department.

Associate membership.—Bateman, J., Sheffield and District Gas Company; Biggs, N. B., B.Sc., F.C.S., Nitrogen Fertilizers, Ltd.; Britton, J. C., Newton Chambers & Co., Ltd.; Bureau, A. C., B.Sc., W. C. Holmes & Co., Ltd.; Crowle, L. S., B.Sc., Gas Light and Coke Company; Dow, D. C., Alloa Gas Department; Fyfe, D. L., United Kingdom Gas Corporation, Ltd.; Harrison, R. K., Southampton Gas Light and Coke Company; Illingworth, F. K., B.Sc., A.I.C., Lancashire Foundry Coke Company; Jennings, A. C., Derby Gas Light and Coke Company; Johnston, R. E., Croydon Gas Company; Kilvert, J. R., South Yorkshire Chemical Works, Ltd.; Mann, W. J., Gas Light and Coke Company; Nicklin, T., B.Sc., Stretford and District Gas Board; Parker, J., Buxton Gas Department; Patching, H. J., Peterborough Gas Company; Phillips, W. G., B.A., Assoc. M.Inst.C.E., Luton Gas Company; Pincock, O., B.Sc.(Eng.), Weston-super-Mare and District Gas Company; Pollicott, F. S., Gloucester Gas Light Company; Richards, B. D., Haywards Heath District Gas Company; Rimmer, G. J., Hinckley Gas Department; Sanderson, E. J., Gas Light and Coke Company; Sheard, K., B.Sc., Newton Chambers & Co., Ltd.; Spence, G. R., Harrogate Gas Company; Stevenson, J., Leek Gas Department; Thompson, D. M., Manchester Gas Department; Thomson, R. J., Motherwell and Wishaw Gas Department; Unsworth, R. H., Wallasey Gas Department; Whitehouse, R. S., Solihull Gas Company; Williams, P. F., Tottenham and District Gas Company.

Associateship.—Baker, N. W., W. J. Jenkins & Co., Ltd.; Dines, W., Gas Light and Coke Company; Graham, J., Lancaster Gas Department; Helps, G., jun., Nuneaton Gas Company; Pamely-Evans, O. G., B.Sc., A.I.C., Guest, Keen & Nettlefolds, Ltd.

NATIONAL GAS COUNCIL

THE Annual General Meeting of the National Gas Council—the first since May, 1939—was held at Grosvenor House, Park Lane, London, on June 8, under the chairmanship of Sir David Milne-Watson, who announced his retirement from the office of President after 24 years' service. The attendance was one of the largest on record. After Mr. W. J. Smith, Secretary, had reported the list of members of the Central Executive Board appointed and nominated respectively by the District Executive Boards and associated bodies, the 22nd, 23rd, 24th, and 25th annual reports and statements of account were presented.

The **President** moved the adoption of the report and accounts for the year ended Mar. 31, 1943, and also, in order to regularise the position, those of the three previous years. After referring briefly to the war conditions which had caused the postponement of the meetings due to be held in those years, Sir David continued: All along we have been confident that however black the immediate outlook might be, and at times it has appeared black indeed, the tide of war which had for so long run against us would turn in our favour. Now it has done so. There may still be dark and difficult days ahead of us, but the issue is no longer in doubt. So through the fog of war we can, and indeed must, begin to look to a future, not so remote as it once appeared, when peace will be again restored, and for which we must prepare if we are not only to hold our own as an Industry, but to expand to the full measure of our capacity.

The Past

Before, however, speaking of the future, I would like to turn back for a little to the years which have elapsed since we last met, and in doing so it is fitting that we should first make mention of those who, though they have gone from our midst, still live in our memories. The list is, alas, a long one, and it is impossible to name them all, but men such as Francis Goodenough, W. W. Townsend, H. D. Madden, Stephen Lacey, and many others besides, rendered yeoman service to the Council and the Industry, and we record our grateful appreciation of their work and, at the same time, our sense of the loss which we have sustained.

Of the work accomplished in each of those years, a full account has been given to you in the monthly reports along with much other information, and a yearly epitome has been sent to you similar in form to the Annual Report now before you. Looking over these, what stands out prominently is the fact that despite abnormal circumstances, despite vicissitudes, and despite difficulties, some of which were inevitable and some were manufactured for us, the Industry has not only carried on, but has been able to render service of steadily increasing value to the State in meeting wartime needs.

No single matter caused us greater preoccupation than that of coal supply, with the related questions of price, quality, contract conditions, transport, &c. There were times when many of us were dangerously short of coal, and when we did get some to keep us going we frequently found that it was of a type but little suited to gas-making. And while quality deteriorated prices went up, yet it was only in some cases, and often with difficulty, that undertakings obtained authority to raise their charges in order to meet the increasing cost of raw materials and labour. What was sauce for the goose, in the guise of the coal industry, was definitely not sauce for the gander, in the shape of the Gas Industry. With the creation of a Ministry of Fuel and Power and the appointment of a Minister who, I am glad to say, has shown himself sympathetic towards the Industry, we now have greater hope that certain grievances may be redressed, and, in particular, that more favourable consideration will be given to our request that we, as very large consumers of coal, should be consulted when an increase in price is contemplated. The formation of the new Ministry was undoubtedly a step in the right direction, but it is unfortunate that the Directorate of Gas Supply, formed earlier of men who had unrivalled technical knowledge of the Industry, should have been disbanded.

On the other hand, we now have closer liaison with the Government than we formerly had through the Board of Trade. We have a representative on the National Coal Board which has been set up by the new Minister, who has also recognized officially as Committees of his Ministry the Public Utilities Coal Committee and the Gas Oil Advisory Committee. The former Committee is, of course, representative of the Conjoint Conference, but it includes a strong representation of our members and it has done sterling service during difficult years. Tribute must also be paid to another Committee which, though not a child of the Council, is fully representative of gas interests. We owe it in large measure to the National Gas and Electricity Committee that the threatened imposition of a system of fuel rationing was avoided. They have held from the beginning, and in the event their contention has been justified, that no system of rationing could be satisfactory and that none should be introduced until every other means of securing fuel economy had been fully tried.

There are many other matters, some of them of first-class importance, with which the Council has had to deal since we last met, but it is impossible without detaining you unduly to mention them all. I must content myself, therefore, with referring you to the Reports in which they are fully described.

The Outlook

Turning now to the future, we undoubtedly have to look forward to great changes in the post-war years, and we have taken and are taking such steps as we can to be in a position to meet them. The task is, however, fraught with great difficulties owing to the absence to date of any definite pronouncement by the Government as to their intentions in regard to the fuel industries generally, and the Gas Industry in particular.

It is manifest, however, from the wide range of subjects covered by the reports of committees set up by the Government—such as those presided over by Lord Justice Scott and Mr. Justice Uthwatt—that, under the general heading of planning, many changes are contemplated, and that a large number of those changes will affect the Gas Industry directly. To safeguard our interests it is therefore essential that we should have a strong national organization able to speak and act for the Industry, to negotiate with the Government, and to make representations to the Legislature. During the twenty-six years of its existence we, as a Council, have accomplished much. We have succeeded in welding into a united Industry a large number of individual units, both large and small, some owned by municipalities, others by companies; we have learned to speak with one voice, and as the years have passed we have gradually acquired great power and influence. But even before the war it was felt that our organization might be still further improved and strengthened. Recommendations to that end were, in fact, formulated and discussed, but they were never put into operation. When, however, the Government turned its attention to post-war planning, action on our part became necessary, and in September, 1941, a Committee representative of all branches of the Industry was set up " to collate information and formulate suggestions for post-war planning so far as concerns the Gas Industry." One of the first tasks of this Committee, which was afterwards made a Committee of the British Gas Federation, was the preparation of a scheme for the reorganization of the national bodies. Their proposals were circulated and evoked a considerable amount of criticism, but, having been substantially modified, are again before the Industry for acceptance.

Important as are the relations of one branch of our Industry with others, more important still will be the relations between the Industry and the Government, and it is for that reason that I urge that whatever form reorganization may take it should be agreed upon and effected without further delay.

In the meantime, substantial progress has been made by the Post-war Planning Committee of the British Gas Federation in preparing to deal with our future relations with the Government—a matter in which the Minister of Fuel and Power has evinced a keen interest. Early this year he asked me, as Chairman of the Committee, to let him have a note on the progress being made by the Gas Industry in planning for the future, and in response to his request I was able to send him a letter describing what had been done and a memorandum prepared by the Committee summarizing the position. It is unnecessary for me to go into details as both my letter and the memorandum have been published in booklet form, but I should remind you that, on the insistence of the Minister, it has been agreed to submit a final report by Aug. 11.

The preparation of this Report will undoubtedly be facilitated by the recent setting up, on our suggestion, of an Advisory Committee of five representatives of the Industry to advise the Minister not only on any question of importance in connexion with matters arising from the Ministry's relations with the Gas Industry, but also with matters concerning future policy. We can congratulate ourselves that we have secured such a strong and competent Committee, elected on the most democratic lines, to handle on our behalf matters which concern us vitally.

As to our future relations with other fuel industries, our aim, and I believe it is also the aim of the Government, should be to secure co-operation and equal opportunity for all. I sometimes hear gloomy forebodings about our prospects as an Industry after the war, but I feel that no importance should be attached to them. Over and over again in our long history we have had to adapt ourselves to changing circumstances. We have always done so with success, and I have no doubt that we shall do so again.

A Personal Statement

Sir David then made a personal statement regarding his retirement. He regretted to say he had been advised to curtail some of his activities, and acting on his doctor's orders he had with great reluctance decided not to offer himself for re-election as President of the National Gas Council or as Chairman of its Central Executive Board. He need not say how much he regretted having to take that step. He had been Chairman for 26 years and President for 24 years, and he had become very much attached to the Council and its work and to his many

friends whom he had met so frequently, but they must all realize that times came when changes had got to take place. He wished to say at once that he was not losing his interest in the Industry. He would take as keen an interest in the welfare of the Industry as he had ever done, and he hoped he might be allowed to partake in its consultations and in its work even if he was not in the chair.

He had been very pleased that morning when at a meeting of the Central Executive Board his name was put forward for election as an honorary member. At any rate when he came to see them and meet and talk to them he would not feel he was an interloper. Apart altogether from the fact that he had to obey his medical advisers he felt that the time had come for a new layout in the Industry with regard to some of its activities, and therefore he felt the best thing he could do was to take this opportunity of not seeking re-election. He thanked all his friends in the Industry very much for the support and kindness he had received from them during the many years they had been working together. Though there had sometimes been differences of opinion he had always felt he had the friendship of his critics, and that they all had their heart and soul in the welfare of the Industry.

After Mr. **F. G. Brewer,** Chairman of the Finance Committee, had dealt with the accounts, the reports and accounts were approved.

Presidency Left Vacant

Mr. **A. W. Smith** explained that the Central Executive Board had, in the light of Sir David Milne-Watson's retirement, considered the question of the Presidency and, on the suggestion of Mr. Frank H. Jones, who was deputizing temporarily, it had been decided not to nominate anyone to follow Sir David while matters were in a state of transition in regard to the national bodies. In the circumstances, it would be ungracious of him, and contrary to the wishes of the members, if he did not make some reference to Sir David's resignation. Some of them had travelled with him from the beginning of the National Gas Council, and they had been astonished at the amount of work he had undertaken. The birth of the National Benzole Association, the British Sulphate of Ammonia Federation, the tar organizations, and so on, all of which he had fathered and seen through their teething troubles, indicated the tremendous amount of energy he had put into his job. They had passed through many troubles and Sir David had guided them along many stormy paths. His devotion to duty had been remarkable and his service had been a wonderful example to them all. He (Mr. Smith) formally proposed:

> "That the members of the National Gas Council, assembled ar their annual meeting on June 8, 1943, desire to express to Sit David Milne-Watson, Bart., LL.D., D.L., their profound regret at his resignation from the position of President of the National Gas Council, a position he has held with distinction for the past 24 years. They again record their deep appreciation of the valuable services he has rendered to the Gas Industry, and desire to thank him for his wise guidance in the solution of many difficult problems and trust that the Industry may still have the benefit of his counsel and advice."

It should be explained, said Mr. Smith, that the word "again" in the resolution was in allusion to the fact that the Council had already expressed, in an illuminated address some years ago, their appreciation of Sir David's qualities.

Major **G. H. Kitson** seconded, and said he felt the decision to leave the Presidency open for the time being was the right one. He had watched with amazement the work Sir David had done for the Industry, and he felt everyone had been proud and delighted with the way he had dealt with every Goliath that had tried to cross their path. He doubted whether any industry had ever for so long a period had the advantage of a chairman who was so knowledgeable and so ready to serve. In the way he had handled the Central Executive Board and the whole of the National Gas Council and all the work connected with it he had performed a service to the entire community which was reflected, through the Council, to the world at large.

The resolution was carried with loud acclamation.

Sir **John Daw** and Sir **Albert Ball,** who proposed and seconded a resolution appointing Sir David Milne-Watson, together with Mr. T. P. Ridley and Mr. R. W. Foot, as honorary members, also paid tribute to the President's long and valued service to the Industry and wished him long life and happiness in his honorary membership. This was carried, and Sir David returned thanks.

Proposed by Alderman **A. R. Bretherick,** seconded by Mr. **Ralph Halkett,** Alderman Sir William Kay was re-elected Hon. Treasurer, Sir John Daw and Alderman J. H. Lloyd were re-appointed Trustees, amd Mr. A. Morland Auditor.

The **President** proposed a vote of thanks to the Chairmen and Secretaries of the District Executive Boards, and pointed out that the whole organization of the National Gas Council was based on the districts. If the new constitution went through, he very much hoped district organization would become even more important than it was at present. Nevertheless the districts would realize that they could not always have their own way. There were different views, and sooner or later somebody must give way. The Council as a whole must accept a majority view, and he urged them to remember that however strongly they felt, and however important it was that every district should be consulted—and he was in favour of all the districts being consulted as much as possible—they could not expect the views of any particular district always to be accepted. They must be prepared to make sacrifices in order that they might have a united house ; unless they were united they would fall.

Mr. **E. V. Evans** seconded the vote of thanks, and thanked the Chairmen and Secretaries for giving up so much of their precious time not only to the work of the National Gas Council, but to the post-war planning work that was now going on throughout the country.

Mr. **E. Crowther** responded for the Chairmen and Mr. **G. Dixon** for the Secretaries. Mr. Dixon foresaw in the reconstruction now taking place new opportunities for the districts to take their proper part in the work that was going to be done. He believed there would be a need for paid staffs in the regional headquarters of the Industry in the future, and he earnestly hoped a great many more people on the ownership side of gas undertakings would take part in their future discussions.

The **President** proposed a vote of thanks to the staff, making special reference to the work of Colonel S. S. Ogilvie, Mr. E. J. Fottrell (Joint Managers), and Mr. W. J. Smith (Secretary). Mr. Fottrell, he said, was seconded for Government duty early in the war, but he had now returned to the National Gas Council.

Sir **Frederick West** seconded the resolution, and Colonel **Ogilvie** replied for the whole staff, mentioning particularly the loyalty and devotion to duty of the junior members of the staff.

Mr. **Frank H. Jones** voiced the thanks of the meeting to the President for presiding, to which he added his personal tribute, and the proceedings then closed.

SEVERN VALLEY GAS CORPORATION, LTD.—continued.

we can bring him back in some appropriate capacity. He at present holds an important appointment on the staff of the victorious First Army in North Africa. Mr. C. B. Mawer, who assumed Colonel Dawnay's duties at the very outbreak of war, and has carried them out with ability, has been appointed Joint Secretary to succeed him. Stockholders will also be interested to know that Lieut.-Col. R. H. Studholme, who has been so closely identified with the Corporation, holds an important staff appointment in the armies of the Middle East.

Throughout the Gas Industry earnest thought is being given to plans for the future. It is generally recognized that one of the first essentials is to bring about close co-operation between undertakings in each region. The record of this Corporation and of others working on parallel lines has demonstrated the value of such co-operation, and one method of bringing it about.

The report and accounts were unanimously adopted.

South-Western Gas and Water Corporation, Ltd.

At the Annual General Meeting of the South-Western Gas and Water Corporation, held in London recently, a final dividend of 3% on the ordinary shares was declared, making a total of 5% for the year —the same.

The Chairman (Mr. R. B. H. Ottley), in the course of his speech, said: Once again circumstances prevent my addressing other than the briefest of speeches to you, but there are one or two items to which I would like to draw your attention.

The accounts show further expansion in the revenue to £52,082. The carry forward was increased to £1,547.

Dividends and interest on investments in subsidiary companies are shown at £33,156 7s. 8d., as against £31,995 in the preceding period. Once more our miscellaneous investments generally show improved results, and I shall hope next year to report a really substantial improvement under this head; indeed, some progress to this end has been already made since the close of the financial year with which we are dealing.

Last year I expressed anxiety lest the gas-rationing scheme with which we were threatened would add an additional burden to the difficulties with which our undertaking has to compete in wartime. This we were spared, and our staff, depleted as it must necessarily be, has been able to keep our flag flying to the satisfaction of the Board, our consumers, and, we hope, our shareholders also.

We must congratulate Mr. Allen and his people for the excellent work they have done, and in particular for the manner in which they have been able to arrange for our coal stocks.

We hope we may be able to present you with at least as good a report this time next year, and, maybe, in happier circumstances.

One of the largest industrial undertakings in the country has overcome the sticking or seizure of stop valves on steam lines and on systems where heat is encountered by painting on to the contacting surfaces a dispersion of "dag" colloidal graphite in acetone, forming a thin dry film which enables the valve to be assembled almost immediately. After two months the valves could be operated without the slightest difficulty, whereas previously rust and seizure had inevitably occurred. The success of this method lies in the parting action of the graphite film, which provides the right amount of lubrication when the valve comes into operation. It is unaffected by all temperatures met with in steam plant. E. G. Acheson, Ltd., 9, Gayfere Street, London, S.W. 1, inform us that they will be pleased to forward information about this extremely simple and speedy method to any who are interested.

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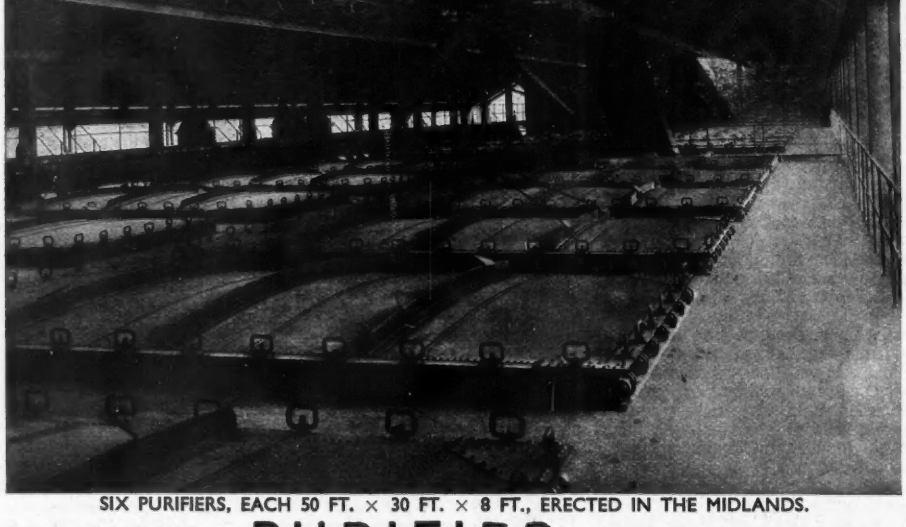

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MOBILE GAS PRODUCERS*

By J. R. DENOON, Edinburgh

I PROPOSE to discuss the cross-draught producer as represented by the modified Government emergency producer. In this type the flow of gas and air is across the producer and the combustion zone is limited to a small area. Air, which may be pre-heated and may carry water vapour, is introduced through a water-cooled tuyere at high velocity. This results in the development of temperatures of up to 2,000°C. in the combustion zone. The gas leaving the producer is generally cooled by passing through a series of air-cooled tubes. Provision has to be made for removing dust which collects in the tubes. A great deal of research has been carried out on filters, and it may be assumed that finality has not been reached in filter design. Most filters fall into the following grouping: (1) Cyclones and centrifugal separators. Only comparatively large particles are removed by this method. (2) Dry filtration. Fabric filters are extensively used on the Continent with plants using charcoal and give efficient filtration. If used with other fuels containing moisture the filter is apt to become choked. Fabric filters will char and tend to disintegrate if the gas temperature is excessive. Coke, wood wool, and wire wool have all been used as dry filters, but sisal tow is the most popular filtering medium of this type. Care has to be taken in packing the sisal filter to avoid channelling, and it must not be over-heated.

Wet filtration is generally adopted if activated fuels are used, and may consist of either passing the gas through a moistened filtering medium or bubbling through oil or water. Oiled or wet coke, oiled sisal, or wood wool filters are examples of the first type. It is claimed that oil washing reduced engine wear by introducing upper cylinder lubricant into the gas stream.

The air supply to the producer may be direct to the tuyere or may be pre-heated by passing through a heat exchanger. Water may be injected at the tuyere or prior to pre-heating. The modified Government emergency producer pre-heats the air by using the first cooling tube as a heat exchanger, water being injected into the air stream before pre-heating. It is generally recommended that water consumption should be about 25% by weight of the fuel consumed.

When converting a petrol-driven vehicle to run on producer gas the following additional controls or their equivalent are advisable:

(1) Bowden controlled air admission valve, which is located in the supply pipe in close proximity to the inlet manifold.

(2) Gas throttle, connected to accelerator pedal with Bowden controlled tick-over setting.

(3) Petrol throttle, disconnected from accelerator and operated by Bowden control.

(4) Ignition control should be variable. If no variable control is fitted it is advisable to adapt the system to manual control. The automatic correction for speed should, of course, be retained.

(5) A control petrol cock is necessary to shut off the petrol supply.

The gas is introduced into the induction system by fitting a tee between the inlet manifold and the petrol carburetter.

Fuels used for mobile producers are as follows:

Wood charcoal, wood, peat-charcoal, lignite, low or high temperature coke, and anthracite. Factors which influence the performance of a fuel are reactivity, size and grading, moisture content, ash and volatile content.

Low or high temperature coke should conform to the following specification. *Volatile matter*—as high as possible, provided that the limit for potential tar is not exceeded; "*potential tar*"—less than 10 oz. per ton; *ash*—less than 5%; moisture—not limited (except for fabric filters) but should preferably be under 5%; *size*—$\frac{3}{4}$ in. to $\frac{3}{16}$ in.

The calorific value of the producer gas from H.T. coke (air free basis) using pre-heated air and steam will vary from 110 to 130 B.Th.U./cu.ft. Fuel consumption is, as a rule, approximately 1 lb. per 6 h.p. hour. A 2-ton lorry with 2 tons pay load consumes approximately 1 lb. per mile when using coke.

Comparison with Petrol Engine

The theoretical loss of power on conversion to producer gas is approximately 30%, and in some cases this may be as high as 50%. By modifying engine design and increasing the compression ratio to 8 or 9 to 1 the efficiency be increased, but pre-ignition and detonation are likely to take place if the vehicle is run on petrol. As the producer gas'air mixture burns more slowly than a petrol/air mixture, it is a decided advantage to advance the ignition by about 8 to 10° when running on producer gas. In some engines it may be advisable to fit special sparking-plugs to obtain optimum results on producer gas.

Edinburgh Corporation Gas Department purchased a modified Government emergency producer in 1942. This was designed as a trailer unit, and was fitted to a 2-ton Bedford lorry. No modifications were made to the compression ratio. On comparing the performance on producer gas with petrol the following points were noted: (1) There is a decided loss of power; (2) acceleration is slower; (3) more gear changing is required; (4) there is no pre-ignition when pulling slowly in high gears, and the engine runs more quietly on producer gas. In spite of the power loss, no difficulty was experienced in climbing steep hills, although generally a lower gear had to be used than when running on petrol.

The producer consists of a thin steel vertical cylinder approximately 4 ft. 6 in. by 1 ft. 6 in. fitted with a circular charging door at the top and a similar discharging door at the base. These doors are fitted with asbestos rope joints to minimize the possibility of air leaks. The tuyere is water cooled by a circulation system from an annular water tank fitted round the upper part of the producer. A grid is fitted over the offtake pipe to prevent the fuel being carried over in the gas stream.

The air supply is pre-heated by the first cooler as previously described, and water injection is carried out by means of a Zenith carburetter gravity fed from a small tank. Dual-stage sisal tow filters were fitted and these give efficient filtration on non-activated fuels. These filters must be regularly cleaned, and care should be taken not to clean filters simultaneously, as clean sisal passes a certain amount of dust before the filter becomes effective.

The producer is filled with fuel (approximately 200 lb. of coke) and the water supply to the air inlet is turned on. A plug is removed from the tuyere, allowing cold air to enter the tuyere directly. The engine is started on petrol, and run at a fairly fast tick-over, with the gas throttle partly open and the air valve closed.

A paraffin-soaked torch is then applied to the tuyere inlet, and ignition takes place in about 20 seconds. The plug is then replaced. The engine is kept running on petrol until the fire has been drawn up and gas is being produced. This generally takes 2–3 minutes. The air inlet valve is then opened, ignition advanced, petrol throttle closed, and the air valve adjusted until the engine is running smoothly. The petrol tap is then turned off, and the vehicle may then be driven off on producer gas. Readjustment of the air valve is necessary at intervals, to compensate for variations in the quality of the gas, as full power is not developed for approximately 20 minutes after lighting up.

The vehicle can be stopped for periods up to 10 minutes and be driven off on gas. For stops between 10 minutes and 2 hours the fire may be pulled up by running the engine on petrol, but if left over this period relighting is necessary.

At the conclusion of the run the engine is switched on to petrol, and the producer allowed to cool overnight. It is emptied and refilled the following morning. About 120–150 miles are obtainable from a single charge of suitable coke.

The clinker formed in the producer has a typical "bird's nest" form and is very easily removed.

Maintenance

(1) Engine oil should be carefully examined and changed when necessary.

(2) Gas line and inlet manifold require cleaning at long intervals.

(3) Gas and air valves should be occasionally lubricated.

(4) Spark plugs should be cleaned more frequently than with petrol engine.

(5) Decarbonizing should be carried out every 2,000 miles.

Cylinder wear on petrol is generally about 0.4 thous. per 1,000 miles; with producer gas and efficient filters wear is approximately 0.6–1.0 thous. per 1,000 miles.

Several test runs have been carried out over a course near Edinburgh and typical results are appended.

Road Test of High Temperature Fuel

Starting up.—The fuel ignited easily in 15 sec. and total time to change over was 3 min. 50 sec.

Power was satisfactory and improved steadily during the test.

Flexibility was good, and idling was satisfactory.

Bulk density:

24.6 lb/cu.ft. (loose packing).

27.4 lb./cu.ft. (dense packing).

Grading: %

$\frac{1}{2}$ in.–$\frac{1}{4}$ in. = 33.0

$\frac{1}{4}$ in.–$\frac{1}{8}$ in. = 43.0

$\frac{1}{8}$ in.–$\frac{3}{4}$ in. = 24.0

Potential tar (*oz./ton*) = 1.0.

C.A.B. (*cu.ft./min.*) = 0.041.

Proximate analysis: Moisture, 4.8; V.M., 2.0; F.C., 88.9; ash, 4.3%.

Vehicle—2-ton Bedford lorry.

Distance	103 miles.
Fuel consumption	1.43 (lb./mile).
Water to producer	0.21 (lb./lb. of fuel).
Gross time to change over	3.50 min. sec.
Weight of clinker	4.75 lb.
Dust (below $\frac{3}{16}$)	5.5 lb.
Average speed	21.96 m.p.h.

(*To be concluded*)

* From a Paper to the Scottish Junior Gas Association (Eastern District), March 13.

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Products Prices—Stocks and Shares

The London Market June 14.

All Coal Tar Products are in good demand, and Pitch in the London area remains about 55s.

Attention is called to a new Government Order which has just been issued, the Control of Coal Tar Naphtha and Xylole Order, 1943 (S. R. & O. 1943, No. 768).

This new Order differs from the old 1942 Order mainly in the fact that it embraces the supply of these commodities in very small quantities.

Apart from this there is nothing of interest to report.

The Provinces June 14.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 10d., pure, 2s. 5d. (controlled by the Control of Toluene No. 2 Order, July 3, 1941, which fixes the maximum price at which this material may be sold). Naphtha and Xylole controlled by the Coal Tar Naphtha and Xylole Order, 1942, dated Dec. 7, 1942, and operative from Dec. 21. Carbolic acid, 60's, naphthalene, and anthracene controlled by the Coal Tar Products Prices Order S. R. & O. 2509, dated Dec. 7, 1942, and operative from Jan. 1, 1943. Filtered heavy oil (min. gr. 1,080), 7½d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5¼d.; timber preservation and other purposes 4¾d. to 6d.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland June 12.

Deliveries are proceeding rapidly with prices steady. Refined tar controlled. Value is 4½d. per gallon *ex* Works, naked. Creosote oil: Specification oil, 6½d. to 7d.; low gravity, 7¼d. to 7½d.; neutral oil, 6d. to 6½d.; hydrogenation oil, 5⅞d. per gallon; all *ex* Works in bulk. Refined cresylic acid is active at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha: 6½d. to 7d. per gallon. Solvent naphtha: Basic prices delivered in bulk, 90/180 grade 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d.; Rectified, 2s. 3d. per gallon. Pyridine: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

Pending war developments, markets remained quiet and uninteresting throughout last week with prices drifting downwards. The news of the fall of Pantellaria received at the time of writing probably came too late to have any marked effect on the general position.

Conditions were also quiet in the Gas Market, although there was no actual falling off in the volume of business done compared with the past few weeks. Prices were well maintained and several stocks recorded quite good rises. The feature was a gain of 10 points in Plymouth ordinary to 92½; the last transaction in this stock was recorded in March last at 80½. In the Supplementary List Eastbourne "B" gained 4 and on the Bristol Exchange Weston-super-Mare closed 4½ points better.

The following is the complete list of price changes during the week:

OFFICIAL LIST

Bombay Ord.	23/—24/-	+-/6d.
Brighton Cons.	83—88	+2
Commercial 3 p.c. Deb. (*x.d.*) ...	60—65	June 7
Imperial Continental	83—86	+1
Oriental	108—113	+1
Plymouth Ord....	90—95	+10
Portsmouth Cons.	120—125	+2
Primitiva Holdings Ord.	12/—14/-	—-/6d.
South-Eastern Gas Corporation 4 p.c. Cum. Pref.	19/3—20/3	+1/6
Tottenham 4 p.c. Pref. (*x.d.*) ...	102—107	June 7
Watford 3½ p.c. Red. Deb. (*x.d.*) ...	90—95	"

SUPPLEMENTARY LIST

Eastbourne "B"	47—52	+4

PROVINCIAL EXCHANGE

Weston-Super-Mare Cons.	103—106	+4½

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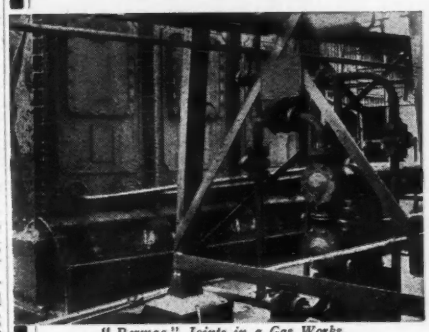

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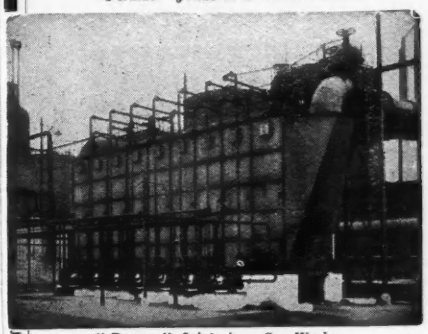

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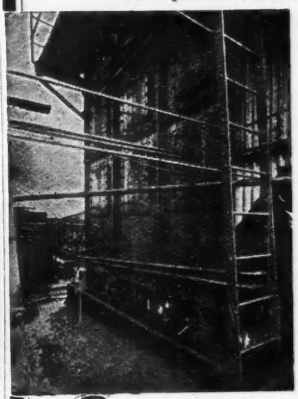

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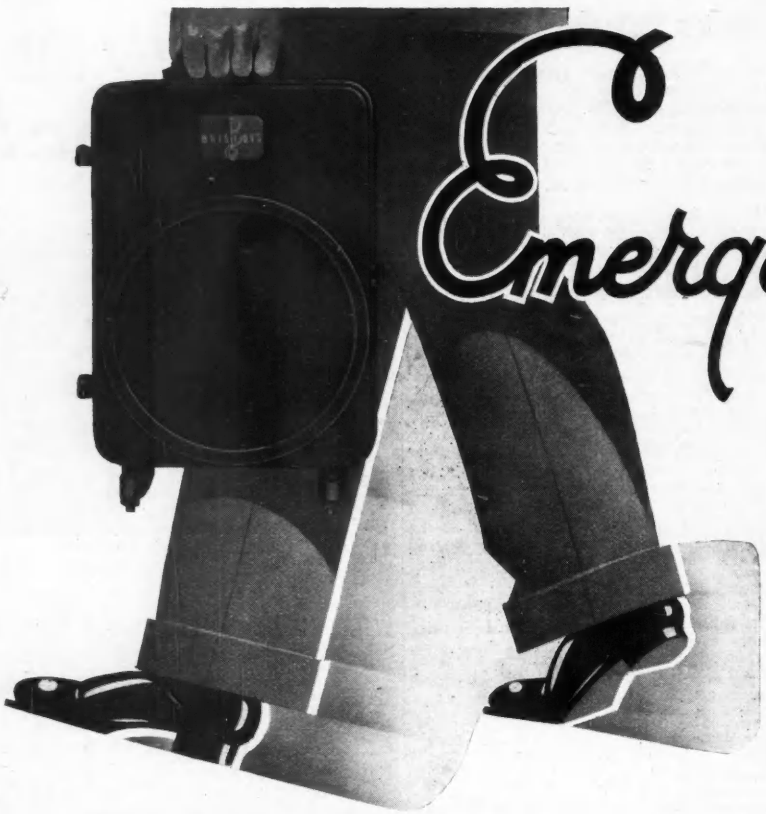

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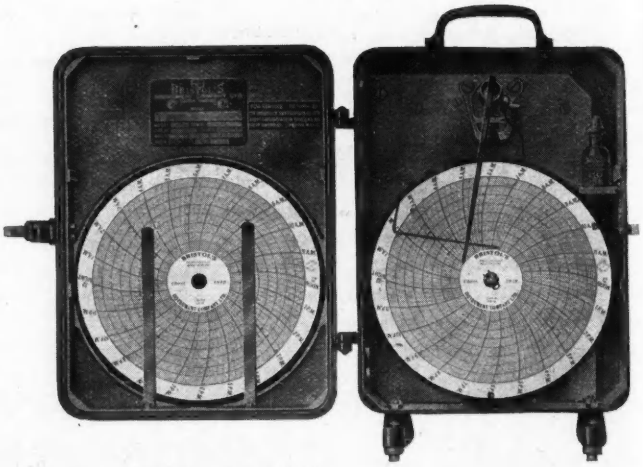

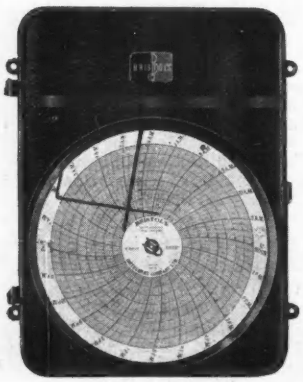

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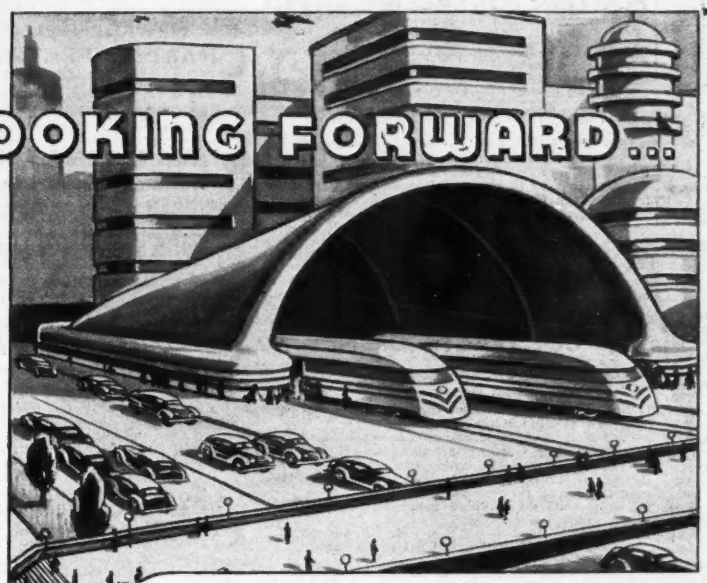

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Sole Makers of the "P.M" semi-water Gas Plant.
Telegrams: "Blakeleys, Church Fenton."
Telephone: Barkston Ash 234 and 235 (Private Branch Exchange). Code: "Bentleys."

THE BRITISH GAS PURIFYING MATERIALS CO., LTD.
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Telegrams: "BRIPURIMAT"—LEICESTER— Telephone: 59086.

IRISH BOG ORE
Porous and Light
Easy to Work
A War Time Economy of Labour
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ROBERT DEMPSTER & SONS, LTD., ELLAND, Builders of CARBONIZING PLANTS, both Horizontal and Vertical. Manufacturers of CONDENSERS, PURIFIERS, GASHOLDERS, &c., also every description of COAL and COKE HANDLING PLANT. *Telegrams:* "Dempster, Elland." *Telephone:* Elland 2241, 2242 and 2243.

APPOINTMENTS VACANT

CHARING AND DISTRICT GAS-WORKS LIMITED (near Maidstone)

WORKING MANAGER required for above Undertaking (3 million cu.ft. per annum), able to do shovel-charging and execute usual maintenance and repairs. Salary £4 per week, with house, fuel and lighting.

Apply, enclosing *copies* only of Testimonials to
Gas-Works, W. A. HOWIE,
St. Peter Street, Director and Engineer.
Maidstone, Kent.

COUNTY BOROUGH OF OLDHAM

(GAS DEPARTMENT)

ASSISTANT CHEMIST

APPLICATIONS are invited for the appointment of ASSISTANT CHEMIST, from qualified Chemists or Fuel Technologists. The appointment will, in the first place, be temporary, but may lead to permanency later.

The position is graded £270—£315 per annum, plus cost-of-living bonus as determined by the Council, at present £33 16s. per annum. The commencing salary will be according to qualifications.

The sucessful candidate may be required to pass a Medical Examination, and to contribute to the Superannuation Fund of the Corporation. The successful candidate will also be required to reside in the Borough or in a district to be approved by the Corporation.

Conditions relating to appointments should be obtained from the Borough Gas Engineer, and applications, endorsed "Assistant Chemist," stating Age, Qualifications, and particulars of Training, accompanied by *copies* of three recent Testimonials, to be forwarded to him at the Gas Offices, Greaves Street, Oldham, and received not later than first post Wednesday, June 23, 1943.

Canvassing or submitting testimonials from Members of the Council or of any Committee appointed by the Council, or any Official of the Council, will be a disqualification.

Town Hall, THOMAS ALKER,
Oldham. Town Clerk.
June 3, 1943.

BOROUGH OF DARWEN

APPOINTMENT OF GAS ENGINEER AND GENERAL MANAGER

APPLICATIONS are invited for the position of ENGINEER AND GENERAL MANAGER of the Darwen Corporation Gas Undertaking.

Applicants must be qualified Gas Engineers and have a thorough practical knowledge of modern gas manufacture and distribution, together with commercial experience.

The salary will be at the rate of £600 per annum, rising by two annual increments of £50 to £700 per annum with Bonus and Car Allowance.

Particulars of Duties and Conditions attaching to the appointment may be obtained on application to the undersigned.

The person appointed must devote the whole of his time to the duties of the office and must reside within the Borough.

The appointment will be terminable by two months' notice on either side.

Selected Candidates will be required to supply 24 copies of their application and Testimonials.

Applications, stating Age, Qualifications, Experience and present employment and accompanied by *copies* of three recent Testimonials to be delivered to the undersigned endorsed "Appointment of Gas Engineer" not later than June 30, 1943.

Town Clerk's Office, CHARLES COUTTS BYERS,
Darwen. Town Clerk.
June 5, 1943.

WORKS TECHNICAL ASSISTANT

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT (young man preferred). Must be ineligible for call-up. Apply to F. G. BROCKWAY, Engineer, Cleethorpes Gas Company, Cleethorpes, Lincs.

PLANT &c. FOR SALE & WANTED

'PHONE 98 STAINES.

FOR SALE.—Boncourt 6B Gas Fired Boiler; Weir Service Pump, 5¼ in. by 4¼ in. by 12 in.; 30 K.W. Belliss Steam Generating Set, 220 volts D.C.; Sissons High Speed Enclosed Engine Cylinders, 9 in. by 6 in.; 2 in., 3 in., 4 in. Centrifugal Pumps.
HARRY H. GARDAM & CO., LTD., STAINES.

NEW LIFTING GEAR for sale, including Worm Geared Blocks, Gin Wheels, Sheer Legs, Shackles, &c. Capacities up to 5 tons. Available against priority to firms on Work of National importance. Particulars from GEORGE COHEN, SONS & CO., LTD., Contractors' Tools Section, Wood Lane, London, W. 12.
Tel.: Shepherds Bush 2070.

WANTED.—18-20 h.p. Vertical totally enclosed STEAM ENGINE to work at a steam pressure of 100-120 lb. per sq.in. Full particulars to H. B. KENDRICK, M.Inst.Gas E., Conway Gas Company, Ltd., Castle Street, Conway.

CONTRACTS OPEN

PONTYPRIDD URBAN DISTRICT COUNCIL

(GAS DEPARTMENT)

TENDERS are invited for the supply and delivery of a TURBO BOOSTER.

Particulars and Specification may be obtained from Mr. David Muir, Gas Engineer and Manager.

Tenders in plain sealed envelopes marked "Tender for Booster" should be received by the undersigned not later than 12 noon on June 30, 1943.

The Council do not bind themselves to accept the lowest or any Tender.

Municipal Buildings, H. L. PORCHER,
Pontypridd. Clerk of the Council.
June 4, 1943.

PONTYPRIDD URBAN DISTRICT COUNCIL

(GAS DEPARTMENT)

TENDERS are invited for NEW COVERS, &c., for two 25 ft. Purifiers.

Particulars and Specification may be obtained from Mr. David Muir, Gas Engineer and Manager.

Tenders in plain sealed envelopes marked "Tender for Purifier Covers" should be received by the undersigned not later than 12 noon on June 30, 1943.

The Council do not bind themselves to accept the lowest or any tender.

Municipal Buildings, H. L. PORCHER,
Pontypridd. Clerk of the Council.
June 4, 1943.

TROTTER, HAINES & CORBETT LIMITED
FIRE-CLAY & BRICKWORKS
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GAS RETORTS in BEST STOURBRIDGE QUALITY also SILICIOUS QUALITY 81% SILICA

HIGH GRADE INSULATING QUALITY FIREBRICKS

REGENERATIVE TUBES & TILES

COMPANY NOTICE

THE BARNET DISTRICT GAS & WATER COMPANY

NOTICE IS HEREBY GIVEN that the TRANSFER BOOKS of this Company relating to DEBENTURE STOCK WILL BE CLOSED on the 23rd June, 1943, and REOPENED on the 1st July, 1943.

Offices: Station Road, By Order of the Board,
New Barnet, E. D. DAVEY,
Herts. Secretary.
June 11, 1943.

PATENTS

MEWBURN, ELLIS & CO.,
CHARTERED PATENT AGENTS
AND TRADE MARK AGENTS
70 & 72, Chancery Lane, London, W.C.2.
Telegrams: "Patent, London." 'Phone: Holborn 0407
And 3, St. Nicholas Buildings, Newcastle-on-Tyne.

KINGS PATENT AGENCY, LTD.
(Director, B. T. King, A.I.M.E., Patent Agent)
Advice, Handbook, and Consultations free. 146a, Queen Victoria Street, London, E.C. 4. Phone: City 6161

EDUCATIONAL

UNIVERSITY OF LEEDS

GAS RESEARCH FELLOWSHIP

APPLICATIONS are invited for the GAS RESEARCH FELLOWSHIP of the Institution of Gas Engineers tenable in the University of Leeds. The Fellowship, of the value of £200 for one year but with the possibility of extension for a further year, will be awarded to a suitably qualified candidate for the prosecution of post-graduate research in Gas Chemistry.

Applications (on the prescribed form, which can be obtained from the Clerk to the Senate, The University, Leeds) must be submitted not later than July 1.

UNIVERSITY OF LEEDS

ENTRANCE SCHOLARSHIPS IN GAS ENGINEERING AND CHEMICAL ENGINEERING

APPLICATIONS are invited for the following ENTRANCE SCHOLARSHIPS tenable from the beginning of the Autumn Term, 1943:

The CORBET WOODALL SCHOLARSHIP in Gas Engineering. Tenable for 3 or 4 sessions. Value £60 a session. The successful candidate will be required to pursue a degree or diploma course in Gas Engineering and to give an undertaking to follow the profession of a gas engineer.

The UNITED KINGDOM GAS CORPORATION SCHOLARSHIPS in Gas Engineering or Chemical Engineering. Tenable for 3 or 4 sessions. Value £120 a session. The successful candidates will be required to pursue degree courses in Gas Engineering or Chemical Engineering. Candidates must be of British nationality. Applications (on the prescribed form which can be obtained from the Clerk to the Senate, The University, Leeds) must be received not later than August 1.

AUTHORITATIVE CORRESPONDENCE TRAINING

T.I.G.B. Students have gained 29 FIRST PLACES and Hundreds of Passes in the Examinations for A.M.Inst.C.E., A.M.I.Gas E., A.M.I.Chem.E., A.M.I.Mech.E., A.M.I.E.E., C. & G., etc.

Qualify Now by Home-Study with the T.I.G.B.

The Department of Fuel Technology covers **Gas Supply, Gas Engineering, Gas Power, Engineering,** and the **Certificates of The Institution of Gas Engineers.**

Write to-day for "Engineer's Guide to Success"—FREE—containing the world's widest choice of engineering courses—over 200—and which alone gives the Regulations as to admission to various examinations such as A.M.I.Gas E., A.M.Inst.C.E., A.M.I.Mech.E., A.M.I.Chem.E., C. & G., &c. The T.I.G.B. guarantees training until successful.

THE TECHNOLOGICAL INSTITUTE OF GREAT BRITAIN
148 TEMPLE BAR HOUSE, LONDON, E.C.4

STANTON Spun Iron PIPES